

Herstmonceux Energy tests

Graham Appleby

The target signature of satellites carrying uncoated retroreflectors depends upon the polarization of the incident beam. Arnold (2002) has calculated exhaustively the cross-sections and range corrections for LAGEOS-type satellites in both linear and circular polarization and finds a difference of several millimeters. At Stromlo and Herstmonceux we have set up experiments to see if there are measurable differences between linear and circular polarizations, by arranging for a quarter-wave plate to be inserted into the transmit beam, or withdrawn from it, at will during ranging (e.g. on normal point boundaries).

Further, there is anecdotal evidence, particularly from Orroal and Herstmonceux, of systematic variations in the intensity of the transmitted beam depending upon where the telescope is pointing. This may be attributable to linear polarization effects at the Coude path mirrors as they rotate with respect to the electric vector, in which case they would be eliminated by converting to circular polarization. This, too, is being studied theoretically and experimentally using the quarter-wave plate inserters.

Reference:

Arnold, D.A.: "Retroreflector Array Transfer Functions", Proc. 13th International Workshop on Laser Ranging, Washington DC, October 2002. See also:

http://ilrs.gsfc.nasa.gov/working_groups/signal_processing_wg/spwg_activities/index.html